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Part 1: Vision, Technologies and Strategy

Technologies de l'information — Cadre multimédia (MPEG-21) —

Partie 1: Vision, technologies et stratégie

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Contents

Page

Foreword v

Executive Summary vii

Introduction viii

1 Scope 1

2 Terms and definitions 1

3 Symbols and abbreviated terms 2

4 Structure of the Technical Report 5

5 Overview 5
5.1 Problem Statement 5
5.2 Solution Statement 5
5.3 Normative Implications 6
5.4 Conformance and Reference Software 6
5.5 Description of a Multimedia Framework Architecture 6
5.5.1 Introduction 6
5.5.2 Digital Items 7
5.5.3 Users 7
5.6 Example MPEG-21 Use Case 7
5.6.1 Introduction 7
5.6.2 Enabling MPEG-21 Technologies 8
5.7 Collaboration with other multimedia standardisation initiatives 10

6 About ISO/IEC 21000-1:2001 10

7 Overview of the MPEG-21 Parts 11
7.1 Introduction 11
7.2 Part 1 – Vision, Technologies and Strategy 11
7.3 Part 2 – Digital Item Declaration (DID) 11
7.4 Part 3 – Digital Item Identification (DII) 12
7.5 Part 4 – Intellectual Property Management and Protection (IPMP) 12
7.6 Part 5 – Rights Expression Language (REL) 12
7.7 Part 6 – Rights Data Dictionary (RDD) 13
7.8 Part 7 – Digital Item Adaptation (DIA) 14
7.9 Part 8 – Reference Software 14
7.10 Part 9 – File Format 14
7.11 Part 10 – Digital Item Processing (DIP) 15
7.12 Part 11 – Evaluation Methods for Persistent Association Technologies 15
7.13 Part 12 – Test Bed for MPEG-21 Resource Delivery 15
7.14 Part 13 – Scalable Video Coding 15

8 MPEG-21 Achievements 16
8.1 Introduction 16
8.2 ISO/IEC 21000-2: Digital Item Declaration (DID) 16
8.2.1 Goal 16
8.2.2 Rationale 16
8.2.3 Key concepts and basic approach 17
8.3 ISO/IEC 21000-3: Digital Item Identification (DII) 20
8.3.1 Goal 20
8.3.2 Rationale 20
8.3.3 Key concepts and basic approach 20
8.4 ISO/IEC 21000-5: Rights Expression Language (REL) 20

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8.4.1 Goal **20**
8.4.2 Rationale **20**
8.4.3 Key concepts and basic approach **21**
8.5 ISO/IEC 21000-6: Rights Data Dictionary (RDD) **22**
8.5.1 Goal **22**
8.5.2 Rationale **22**
8.5.3 Key concepts **23**
8.6 ISO/IEC 21000-7: Digital Item Adaptation (DIA) **23**
8.6.1 Goal **23**
8.6.2 Rationale **24**
8.6.3 Key concepts and basic approach **24**

9 Highlights of the MPEG-21 Parts under Development **25**
9.1 Introduction **25**
9.2 ISO/IEC 21000-10: Digital Item Processing **25**
9.2.1 Goal **25**
9.2.2 Rationale **26**
9.2.3 Key Concepts **26**
9.3 ISO/IEC 21000-11: Evaluation Methods for Persistent Association Technologies **27**
9.3.1 Goal **27**
9.3.2 Rationale **27**
9.3.3 Key concepts **27**
9.4 ISO/IEC 21000-12: Test Bed for MPEG-21 Resource Delivery **28**
9.4.1 Goal **28**
9.4.2 Rationale **28**
9.4.3 Key Concepts **28**

Annex A (informative) **List of Activities Related to the Multimedia Framework** **30**

Bibliography **38**

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work. In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1.

International Standards are drafted in accordance with the rules given in the ISO/IEC Directives, Part 2.

The main task of the joint technical committee is to prepare International Standards. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

In exceptional circumstances, the joint technical committee may propose the publication of a Technical Report of one of the following types:

— type 1, when the required support cannot be obtained for the publication of an International Standard, despite repeated efforts;

— type 2, when the subject is still under technical development or where for any other reason there is the future but not immediate possibility of an agreement on an International Standard;

— type 3, when the joint technical committee has collected data of a different kind from that which is normally published as an International Standard ("state of the art", for example).

Technical Reports of types 1 and 2 are subject to review within three years of publication, to decide whether they can be transformed into International Standards. Technical Reports of type 3 do not necessarily have to be reviewed until the data they provide are considered to be no longer valid or useful.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO and IEC shall not be held responsible for identifying any or all such patent rights.

ISO/IEC TR 21000-1, which is a Technical Report of type 3, was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 29, *Coding of audio, picture, multimedia and hypermedia information*.

This second edition cancels and replaces the first edition (ISO/IEC TR 21000-1:2001), which has been technically revised.

ISO/IEC 21000 consists of the following parts, under the general title *Information technology — Multimedia framework (MPEG-21)*:

— *Part 1: Vision, Technologies and Strategy [TR]*

— *Part 2: Digital Item Declaration*

— *Part 3: Digital Item Identification*

— *Part 5: Rights Expression Language*

— *Part 6: Rights Data Dictionary*

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— *Part 7: Digital Item Adaptation*

— *Part 8: Reference Software*

— *Part 9: File Format*

— *Part 11: Evaluation Tools for Persistent Association Technologies [TR]*

The following part is under preparation:

— *Part 10: Digital Item Processing*

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Executive Summary

Currently, multimedia technology provides content creators and consumers with a myriad of coding, access and distribution possibilities. At the same time, communication infrastructure is being put into place to enable access to information and multimedia services from almost anywhere at anytime. Still, no global end-to-end solutions exist allowing all different user communities to interact in an interoperable way. This lack of interoperable (and thus standardized) solutions is stalling the deployment of advanced multimedia packaging and distribution applications although most of the individual technologies are indeed already present.

This motivated MPEG (ISO/IEC JTC1 SC29 WG11) in June 2000 to start to work on the definition of enabling normative technology for the multimedia applications of the 21st century: MPEG-21 “Multimedia Framework”. MPEG-21’s approach is to define a framework to support transactions that are interoperable and highly automated, specifically taking into account Intellectual Property Management and Protection requirements and targeting multimedia access and delivery using heterogeneous networks and terminals. The significant progress that was made in developing MPEG-21 since the publication of first edition of this Technical Report in 2001 (ISO/IEC 21000-1:2001) has led to this updated version.

Based on the above observations, MPEG-21 aims at defining a normative albeit open framework for multimedia creation and sharing for use by all the players in the delivery and consumption chain. This open framework will provide content creators and service providers with equal opportunities in the MPEG-21 enabled open market. This will also be to the benefit of the content consumer providing them access to a large variety of content in an interoperable manner.

The MPEG-21 vision can thus be summarized as follows: *to define a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices used by different communities*.

MPEG-21 identifies and defines the normative technologies needed to support the multimedia delivery chain as described above as well as the relationships between and the operations supported by them. Within the parts of MPEG-21, these elements are elaborated by defining the syntax and semantics of their characteristics, such as interfaces to the elements.

Part 1 of MPEG-21 (ISO/IEC 21000-1) provides:

a) A *vision* for a multimedia framework to enable transparent and augmented use of multimedia resources across a wide range of networks and devices to meet the needs of all Users[1)].

b) A method to facilitate the integration of components and standards in order to harmonise *technologies* for the creation, management, manipulation, transport, distribution and consumption of content.

c) A *strategy* for achieving a multimedia framework by the development of specifications and standards based on well-defined functional requirement through collaboration with other bodies.

1) A User is any entity that interacts in the MPEG-21 environment or makes use of a Digital Item (all capitalised terms are used as defined in Clause 2).

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Introduction

End users' appetite for content and the accessibility of information is increasing at an incredible pace. Access devices, with a myriad set of different terminal and network capabilities, are making their way into end users' lives. Additionally, these access devices are used in different locations and environments. Their users, however, are currently not given tools to deal efficiently with all the intricacies of this new multimedia usage environment.

Enabling "ease of use" is becoming increasingly important as individuals are producing more and more digital media for their personal use and for sharing among family and friends (as is evidenced by the large number of amateur music, photo and media sharing web sites). These amateur "content providers" have many of the same concerns as commercial content providers (management of content, re-purposing of content based on consumer/device capabilities, protection of rights, protection from unauthorised access/modification, protection of privacy of providers and consumers, etc.).

Such developments provide new models for distributing and trading digital content electronically in addition to existing business models for trading physical goods. Such new business models mean that the boundaries between the delivery of audio sound (music and spoken word), accompanying artwork (graphics), text (lyrics), video (visual) and synthetic spaces will become increasingly blurred. Indeed, it is becoming increasingly difficult to identify the different intellectual property rights that are associated with multimedia content. New solutions are required to manage the access and delivery process of these different content types in an integrated and harmonized way, entirely transparent to the user of multimedia services.

This motivates the MPEG-21 Multimedia Framework initiative that aims to enable transparent and augmented use of multimedia resources across a wide range of networks and devices, specifically taking into account Intellectual Property Management and Protection and the heterogeneity of the access and delivery infrastructure.

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Information technology — Multimedia framework (MPEG-21) —

Part 1:
Vision, Technologies and Strategy

1 Scope

This Technical Report has been prepared within ISO/IEC JTC 1/SC 29/WG 11 to reflect the progress made on the definition of the MPEG-21 Multimedia Framework. This progress is a result of the combination of WG 11's efforts to standardise the parts of the multimedia framework where it has the appropriate expertise, and the integration with standards initiatives which are being developed by other bodies. The intention of this collaborative approach is to maximise harmonisation of efforts and enable effective standards solutions to be implemented in the shortest possible time.

The Technical Report is introduced by a problem statement and a solution statement. The problem statement describes a multimedia usage environment founded upon ubiquitous networks that is encouraging new business models for trading digital content. In this environment, the distinction between content types is less clear as their integration as multimedia resources in new products and services makes the traditional boundaries less distinct. In addition, individuals are becoming increasingly aware of the value, both commercial and intrinsic, of their own digital asset resources and new possibilities presented by the tools which enable them to create and collect, package and distribute content. The solution statement introduces the vision of the Multimedia Framework to support transactions that are interoperable and highly automated, which is required to support these new types of commerce.

This MPEG-21 Multimedia Framework is based on two essential concepts: the definition of a fundamental unit of distribution and transaction (the Digital Item) and the concept of Users interacting with Digital Items. The Digital Items can be considered the "what" of the Multimedia Framework (e.g., a video collection, a music album) and the Users can be considered the "who" of the Multimedia Framework.

The goal of MPEG-21 can be phrased as: defining the technology needed to support Users to exchange, access, consume, trade and otherwise manipulate Digital Items in an efficient, transparent and interoperable way. This Technical Report gives an overview of the technologies that have been identified to enable this goal (and that are consequently being reflected into the different parts of the MPEG-21 standard).

In creating its definition of a multimedia framework and in making its proposals and recommendations for further standardisation, MPEG-21 is taking into account other related multimedia activities. The Technical Report identifies other multimedia initiatives that are currently in progress that are considered as candidates for future interaction and collaboration with the standards work plan agreed by MPEG-21 (see also Annex A).

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